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Hiromi Inada

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03/31/2003

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EXAMINER

MOUTTET, BLAISE L

ART UNIT

PAPER NUMBER

2853

DATE MAILED: 03/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/871,739

Applicant(s)

INADA ET AL.

Examiner

Blaise L Mouttet

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 June 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> . | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the reference sign 21 as mentioned on page 11, line 4 or the reference sign 38 as mentioned on page 11, line 8.

In light of the context of the description the examiner recommends amending figure 1 so that reference numerals 45 and 28 refer to the respective DAC and power supply of deflection coil 12 and that reference numerals 38 and 21 be incorporated in the figure to refer to the DAC and power supply associated with intermediate lens coil 5.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the reference signs 52 and 54 as shown in figure 1 and 68 and 69 shown in figure 5A and 5B which are not mentioned in the description.

A proposed drawing correction or corrected drawings or appropriate change in the specification are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 3 and 19-36 are objected to because of the following informalities:

In claim 3, line 2 and claim 21, line 2 "an phase-amplitude" should read --a phase-amplitude-- in accordance with proper syntax.

In claim 19, line 7, claim 32, line 7 and claim 35, line 7 "an electron microscope" should read --the electron microscope-- since it was previously referred to in the claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, line 4, claim 14, line 4, claim 17, line 4, claim 19, line 10, claim 32, line 10 and claim 35, line 10 it is claimed that conditions are set however in the remainder of these claims and the claims dependent therefrom "said condition" is referenced instead of --said conditions--. This leads to confusion as to whether the applicant is intending to claim plural or singular conditions in the setting step. The applicant should either amend "conditions" to read --a condition-- in the above noted sections, change the repeated recitations of "said condition" to read --said conditions-- or change the repeated recitation of "said condition" to read --one of said conditions--. For purposes of examination under 35 USC 102 and 35 USC 103 the examiner is interpreting the claims in light of the first alternative wherein the condition is singular.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Ito US 5,084,618.

Ito discloses, regarding claim 1, a method of observing a specimen (2) in a field of view of an electron microscope comprising:

setting the magnification of said electron microscope (as performed by magnification setting circuit 18 as shown and described in relation to figure 1);

setting condition for moving said field of view (as performed by deflection circuit 12 as shown and described in relation to figure 1 wherein the condition includes conditions for moving the electron scan beam from the first to second angle);

setting a starting position for said field of view (the starting position corresponds to the start of the forward inclined electron beam position 6 as shown and described in relation to figure 1);

moving said field of view based upon the moving condition (column 6, lines 64-67);

illuminating said specimen (2) with an electron beam having a first angle (+) and forming a first transmission image of said specimen in said field of view (column 4, lines 22-29);

adjusting said specimen to a second angle (-) and forming a second transmission image of said specimen in said field of view (column 4, lines 30-35); and

calculating a degree of coincidence (difference) between said first and second transmission images (as explained in column 7, lines 24-43 the degree of coincidence is calculated and used to ascertain the focal point of the microscope).

Ito discloses, regarding claim 19, that the electron microscope comprises a support for the specimen (2) (inherent from figure 1), a deflector (12) for deflecting the electron beam to form the images, an image pick up device (17) and a processor (11) for carrying out the method.

5. Claims 14, 17, 18, 32, 35 and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Aoyama et al. US 5,350,921.

Aoyama et al. discloses, regarding claim 14, a method of observing a specimen in a field of view of an electron microscope comprising:

setting the magnification of said electron microscope (column 4, lines 10-14);

setting a condition for moving said field of view (this corresponds to setting the tilt angle/orientation of the specimen under observation as described in column 4, lines 10-14, it is noted that the alternative of controlling the electron beam is also taught in column 6, lines 28-30);

setting a starting position for said field of view (this corresponds to the beginning of the stepped movement described in column 6, lines 32-46);

moving said field of view based upon the specimen tilting condition (this corresponds to the stepped movement described in column 6, lines 32-46);

illuminating said specimen with an electron beam and forming a line profile transmission image of said specimen in said field of view (this corresponds to the image observation of column 6, lines 58-63 and as described in the embodiment of figures 8a and 8b);

observing said field of view if a change in brightness in said line profile is found (as described in column 8, lines 29-59 the field of view is observed when a change in brightness/intensity exists).

Aoyama et al. discloses, regarding claim 17, a method of observing a specimen in a field of view of an electron microscope comprising:

setting the magnification of said electron microscope (column 4, lines 10-14);

setting a condition for moving said field of view (this corresponds to setting the tilt angle/orientation of the specimen under observation as described in column 4, lines 10-14, it is noted that the alternative of controlling the electron beam is also taught in column 6, lines 28-30);

setting a starting position for said field of view (this corresponds to the beginning of the stepped movement described in column 6, lines 32-46);

moving said field of view based upon the specimen tilting condition (this corresponds to the stepped movement described in column 6, lines 32-46);

illuminating said specimen with an electron beam and forming a transmission image of said specimen in said field of view (this corresponds to the image observation of column 6, lines 58-63);

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selecting a pattern from said transmission image and matching said selected pattern with a preset pattern (this corresponds to the matching of the analyzed objects with objects selected from a preset list described in column 3, lines 65-68 and column 4, lines 20-26); and

observing said field of view if a match is found between the selected and preset patterns (as described in relation to column 2, lines 30-37 and lines 13-14 of the abstract wherein the automated analysis of the identified objects is taught).

Aoyama et al. discloses, regarding claims 32 and 35, a support (71) for the specimen (column 7, lines 41-43), a deflector controlled by knobs (79, 80) to deflect the electron beam (column 7, lines 59-61) to create the transmission image, an image pickup device (inherent to perform image processing as described in column 8, lines 19-28) and a processor (81) coupled to said image pickup device for carrying out the method (column 7, lines 61-64).

Regarding claims 18 and 36, the count (number) of matches is obtained (column 5, lines 23-25).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 4-13, 15-16, 19, 22-31, 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama et al. US 5,350,921 in view of Adams et al. US 5,466,934.

Aoyama et al. discloses, regarding claim 1, a method of observing a specimen in a field of view of an electron microscope comprising:

setting the magnification of said electron microscope (column 4, lines 10-14);

setting a condition for moving said field of view (this corresponds to setting the tilt angle/orientation of the specimen under observation as described in column 4, lines 10-14, the alternative of controlling the electron beam is also taught in column 6, lines 28-30);

setting a starting position for said field of view (this corresponds to the beginning of the stepped movement described in column 6, lines 32-46);

moving said field of view based upon the specimen tilting condition (this corresponds to the stepped movement described in column 6, lines 32-46);

illuminating said specimen with an electron beam having a first angle and forming a first transmission image of said specimen in said field of view (this corresponds to the image observation of the specimen at a first tilt angle as described in column 6, lines 32-46);

adjusting said electron beam to a second angle and forming a second transmission image of said specimen in said field of view (this corresponds to the further measurements at later tilt angles as described in column 6, lines 32-46).

Regarding claims 9 and 27, it is determined whether desired form patterns are present (column 3, lines 65-68).

Regarding claims 11 and 29, autofocus correction is performed for the transmitted images (column 6, lines 47-49).

Regarding claims 12 and 30, a line profile of the transmission images is formed (column 8, lines 29-59).

Regarding claims 13 and 31, the field of view is taught to be observed when the line profile has a contrast greater than 1.2 which is in a range close to 1.4 (column 8, lines 29-40). The applicant is referred to MPEP 2144.05 regarding prima facie obviousness of overlapping ranges.

Aoyama et al. discloses, regarding claim 19, a support (71) for the specimen (column 7, lines 41-43), a deflector controlled by knobs (79, 80) to deflect the electron beam (column 7, lines 59-61) to create the transmission image, an image pickup device

(inherent to perform image processing as described in column 8, lines 19-28) and a processor (81) coupled to said image pickup device for carrying out the method (column 7, lines 61-64).

Aoyama et al. fails to disclose, regarding claims 1 and 19, calculating a degree of coincidence between the first and second transmission images.

Aoyama et al. fails to disclose, regarding claims 4, 7, 22 and 25, that the field of view is observed when the degree of coincidence is between 0 and 100 and not observed at a coincidence of 0 or 100.

Aoyama et al. fails to disclose, regarding claims 5, 6, 15, 16, 23, 24, 33 and 34, comparing the moving condition for the field of view with preset values for the condition when said degree of coincidence is 0 or 100 (i.e. no change in a line profile) and adjusting to these values to the preset values.

Aoyama et al. fails to disclose, regarding claims 8, 10, 26 and 28, that the field of view is observed when the degree of coincidence is in a range between 0 and 5 and 5 and 100.

Adams et al. discloses, regarding claims 1 and 19, calculating a degree of coincidence between first and second images in an electron microscope (the first and second images are obtained from respective steps 72 and 94 as explained in relation to figure 3 and the coincidence is determined in step 98).

Adams et al. discloses, regarding claims 4, 7, 22 and 25, that the field of view is observed when the degree of coincidence is between 0 and 100 and not observed at a coincidence of 100 (these steps result from step 100 of figure 3 in which the difference

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between the two images is determined and used to determine whether or not analysis is performed. It is clear that although Adams does not refer to a numerical value "100" this value is used in the claim to indicate percent similarity between the images which Adams clearly teaches.)

Adams et al. discloses, regarding claims 5, 6, 15, 16, 23, 24, 33 and 34, comparing a moving condition of the field of view with preset values when said degree of coincidence is 100 (i.e. no change in a line profile) and adjusting to these values to the preset values (this is clear from an examination of step 90 of figure 3 in which after the analyses is refrained from the electron scan is continued based on preset scan parameters rather than performing the analyses of steps 72-88.)

Adams et al. discloses, regarding claims 8, 10, 26 and 28, that the field of view is observed when the degree of coincidence is in a range set by the user. As suggested by Adams setting a smaller predetermined level results in a finer detection of distinguishing features in the images (column 6, lines 63 - column 7, line 5).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to perform the selective analyzing procedure taught by Adams et al. with the apparatus and method of Aoyama et al.

The motivation for doing so would have been to minimize the number of necessary computer operations to be performed in the analysis of the specimen and thus reduces the time necessary for the specimen analysis as taught by column 2, lines 13-19 of Adams et al.

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7. Claims 2 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito US 5,084,618 in view of Dougherty US 3,700,801.

Ito discloses that various methods of finding the degree of coincidence are known and that any one of these methods may be adopted (column 7, lines 42-43).

Ito fails to disclose utilizing a phase only correlation to find the differential data.

Dougherty discloses a phase only image correlation method to find differential data which has minimum sensitivity to distortion or other disturbances (column 5, lines 28-38 and lines 51-65) and that this image processing method may be applied to various fields of endeavor involving image processing (column 1, lines 15-23).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the phase only correlation method of Dougherty to find the differential data of the images of Ito.

The motivation for doing so would have been to find the degree of coincidence with minimal distortion as suggested by column 5, lines 28-38 of Dougherty.

8. Claims 3 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito US 5,084,618 in view of Van Dijck US 5,134,288.

Ito discloses that various methods of finding the degree of coincidence are known any one of which may be adopted (column 7, lines 42-43).

Ito fails to disclose utilizing a phase-amplitude correlation to find the differential data.

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Van Dijck discloses a phase-amplitude image correlation method to find differential data for an electron microscope which has reduced sensitivity to noise (column 1, lines 8-35).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the phase-amplitude correlation method of Van Dijck to find the differential data of the images of Ito.

The motivation for doing so would have been to find the degree of coincidence with minimal sensitivity to noise as suggested by column 1, lines 8-35 of Van Dijck.

Contact Information

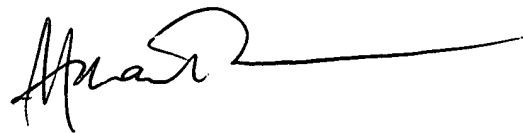
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Blaise Mouttet whose telephone number is (703) 305-3007. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow, Jr. Art Unit 2853, can be reached on (703) 308-3126. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3432.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Blaise Mouttet March 20, 2003

Bm 3/20/2003



Huan Tran
Primary Examiner